

REMARKS

For the reasons set forth in detail below, applicant submits that the present application, including each of the pending claims is in condition for allowance. In the non-final Office Action mailed on November 15, 2005:

- A-** the title of the invention is objected to;
- B-** claims 1-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting;
- C-** claims 1 and 3-6 are rejected under 35 U.S.C. § 102(b); and
- D-** claims 2 and 7-15 are rejected under 35 U.S.C. § 103(a).

Two terminal disclaimers are being filed with this response to overcome the nonstatutory obviousness-type double patenting rejections. In this response specification and claims 1, 7, and 11 are amended and, therefore, claims 1-15 are pending.

A- Objection to Specification

In the Office Action the title of the invention was objected to as "not descriptive." In this response the title of the invention is amended to be more descriptive of the aspects of the invention.

B- Provisional Rejection of Claims 1-15 under Nonstatutory Double-Patenting

In the Office Action, claims 1-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting, as being unpatentable over claims 1-13 of copending Application No. 10/771,839, and over claims 1-3, 5, 7, and 8 of copending Application No. 10/625,411. The Office Action states that a timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection provided the conflicting application or patent either is shown to be

commonly owned with this application or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Two terminal disclaimers are being filed with this response to overcome the nonstatutory obviousness-type double patenting.

C- Rejection Under 35 U.S.C. § 102(b) of Claims 1 and 3-6

In the Office Action claims 1 and 3-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Chung et al. (US Pat. No. 6,218,691).

The currently amended independent claim 1, *inter alia*, is directed to a pinned photodiode formed in a P-well that **is formed in an N-type semiconductor substrate**, wherein a depletion mode transfer transistor is placed between the pinned photodiode and an output node. It further includes a reset transistor coupled between a high voltage rail V_{dd} and the output node, and an output transistor.

Chung, on the other hand, discloses an image sensor exclusively on a P⁺-type substrate (col. 3, lines 20-26, and Fig. 5). The Office Action is silent and does not acknowledge this difference while explaining the basis for the Section 102(b) rejection. Furthermore, Chung does not disclose using a depletion mode transfer transistor. Even the word "depletion" is used only once in Chung's patent in relation to his pinned photodiode.

For a claim to be rejected based on anticipation under 35 U.S.C. §102(a), (b), and (e), MPEP 2131 requires that: "the reference must teach every element of the claim." As elaborated above, Chung does not teach or suggest what is recited in claim 1 and, therefore, a *prima facie* case of anticipation under Section 102 has not been established with respect to these claims and, therefore, the undersigned requests the withdrawal of the Section 102 rejection of these claims.

Claims 2-6 depend from independent claim 1 and accordingly include the features of this independent claim. For reasons discussed above and for the additional features of these claims a *prima facie* case of anticipation under Section 102 has not been established with respect to these dependent claims and accordingly the undersigned requests their allowance.

D- Rejection Under 35 U.S.C. § 103(a) of Claims 2 and 7-15

In the Office Action claims 2 and 7-15, which include independent claims 7 and 11, are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chung et al. (US Pat. No. 6,218,691) in view of the knowledge of one of ordinary skill in the art.

Claim 2, as explained above, in light of the newly amended claim 1, is in condition for allowance.

The currently amended independent claims 7 and 11, *inter alia*, are directed to a plurality of CMOS image sensors arranged in rows and columns, each of which include a pinned photodiode formed in a P-well that is formed in an N-type semiconductor substrate, wherein a depletion mode transfer transistor is placed between the pinned photodiode and an output node. It further includes a reset transistor coupled between a high voltage rail V_{dd} and the output node, and an output transistor.

In contrast, Chung discloses an image sensor **exclusively on a P⁺-type substrate** (col. 3, lines 20-26, and Fig. 5). Chung also does not disclose using a depletion mode transfer transistor and only once uses the word "depletion" in relation to his pinned photodiode. Chung does not teach, suggest, or imply fabricating the image sensor on an N-type substrate. Even when Chung needs an N-type shield to isolate a pixel from the P-epi layer of a peripheral circuit, he merely forms an N-type buried layer over his traditional P-type substrate. Chung also teaches how to fabricate the N-type buried layer over the P substrate (col. 3, line 62 to col. 4, line 16). In addition, nowhere does Chung expressly

mentions or alludes to any of the advantages of having the image sensor on an N-type substrate.

A *prima facie* case of obviousness under 35 U.S.C. § 103 requires, *inter alia*, a suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings (MPEP 2142).

As described above, the main reference, Chung, does not disclose the elements of the rejected claims. In addition, the knowledge of one skilled in the art may not be relied upon to cure this deficiency since the prior art in this field has exclusively developed image sensors on P-type substrates. Therefore, a *prima facie* case of obviousness under 35 U.S.C. § 103 cannot be established as to independent claims 7 and 11, and accordingly, the undersigned requests the withdrawal of Section 103 rejection of these claims.

Claims 8-10 and 12-15 depend from claims 7 and 11, respectively, and accordingly include the features of these independent claims. Therefore, the undersigned requests their allowance.

Conclusion

In view of the foregoing, all of the claims pending in the application are in condition for allowance and, therefore, a Notice of Allowance is respectfully requested. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-6488.

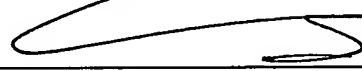
Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 50-0665, under Order No. 384938070US from which the undersigned is authorized to draw.

Dated:

12/28/05

Respectfully submitted,

By



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